WHAT IS CLAIMED IS:

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1. A system for simulating a display of values of a data variable in a field of view, said system comprising:

an image generator comprising a computer having an output and transmitting thereon a video signal comprising at least two digital data channels; and

a display system connected with the output of the image generator and receiving said channels of digital data therefrom;

said display system including a combiner circuit receiving and processing the channels of data;

said display system further having a visual display device connected with the combiner circuit and displaying video imagery derived from said video signal in a field of pixels for viewing by a user;

said digital data channels of the video signal from the image generator each comprising a plurality of bit sets each corresponding to a respective location in the field of view and having a preset number of bits of digital data therein;

the bit sets of the first channel each representing a respective value of the data variable at a first resolution, and the bit sets of the second channel each representing a respective value of the data variable at a second resolution higher than the first resolution.

2. The system according to claim 1, wherein the video signal comprises three digital data channels, and the third digital data channel comprises a plurality of bit sets each corresponding to a respective location in the field of view and ~~having~~ a preset number of

bits of digital data therein;

the bit sets of the third channel each representing a respective value of the data variable at a third resolution that is higher than both said first and second resolutions.

3. The system according to claim 2, wherein the three channels are the red, green and blue data channels of a video output of the image generator.

4. The system according to claim 1, wherein the resolution of each channel is determined by a respective range of corresponding values of the data variable being displayed.

5. The system according to claim 4, wherein the image generator transmits scale values defining said ranges to the display system.

6. The system according to claim 1, wherein the image generator calculates values of the data variable for the locations of the field of view.

7. The system according to claim 6, wherein, after calculation of the values of the data variable, each of the values are stored in two respective data fields in computer-accessible memory of the image generator, said data fields each being part of a respective area storing values of the data variable at respective resolutions, the associated value being scaled by respective scaling parameters for the respective resolutions.

8. The system according to claim 7, wherein the image processor performs additional calculations on said stored values in the scaled form to simulate aspects of viewing of the field of view based on stored parameters defining conditions of viewing.

9. The system according to claim 7, wherein the image generator calculates values of the data variable by determining from scene data stored therein a parameter of a simulated object that is sensed through one of said locations in the field of view and determining the value of the data variable to be displayed for said location in the field of view based on said parameter.

10. The system according to claim 9, wherein the image generator calculates the values using a mathematical model of radiance of simulated objects that are determined to be in view in the field of view.

11. The system according to claim 1, wherein the locations of the field of view each correspond to a respective pixel of the display device.

12. The system according to claim 1, wherein the

13. The system according to claim 1, wherein the data variable is simulated infra-red sensor data generated by the image generator.

14. The system according to claim 13, wherein each of the channels transmits

values of the data variable that are for a respective range of infra-red temperatures, the ranges each having a respective midpoint temperature, one of said midpoint temperatures being an ambient temperature for the simulation being presented to the user.

15. The system according to claim 1, wherein the bit sets are each a set of eight bits.

16. The system according to claim 1, wherein the combiner circuit has scale parameters for each of the channels and derives for each bit set a scaled value of the data variable.

17. The system according to claim 16, wherein the scale parameters for each channel are transmitted from the image generator to the combiner circuitry with each new screen of the video signal.

18. The system according to claim 16, wherein the scale parameters each include a value defining a size of a range of data values in the channel, or minimum and maximum values of the range.

19. The system according to claim 18, wherein the scale parameters each further include a respective offset to compensate for different ranges of data values between the channels.

20. The system according to claim 1, wherein the combiner circuit compares a scaled value from each bit set in the first channel with a scaled value from the bit set of the other channel that corresponds to the same location in the field of view and selects based on said comparison a value to be transmitted to the visual display device.

21. The system according to claim 20, wherein the combiner circuit compares for each bit set a scaled value thereof and selects for the display device a one of said scaled values that is of highest unclamped resolution.

22. The system according to claim 1, wherein the visual display device is a monitor screen or a head mounted display.

23. The system according to claim 1, wherein the visual display device is a monochrome monitor.

24. The system according to claim 1, wherein the system further comprises a gain control simulation device adapted to be operated by the user, said gain control simulation device communicating with the display system so as to simulate therein adjustment of gain by the user.

25. A system for simulation of a FLIR display, said system comprising

an image generator having an output and transmitting thereon a video signal comprising first, second and third digital video channels; and

a display system connected with the output of the image generator and receiving said video signal therefrom, said display system including a combiner circuit receiving and processing the channels of said video signal and producing therefrom an output signal, and a visual display device having a field of pixels viewable by a user of the system, said visual display device receiving the output signal from the combiner circuit and displaying video imagery derived from said signal in said field of pixels for viewing by the user;

each of said channels comprising a plurality of 8-bit sets of pixel data, each of the 8-bit sets corresponding to a respective pixel of the visual display device;

the bit sets of the first channel each representing a respective scaled FLIR intensity value in a first range of intensity values that is between a first minimum corresponding temperature value and a first maximum corresponding temperature value, the first minimum corresponding temperature value being below an ambient temperature value of the simulation and the first maximum corresponding temperature value being above the ambient temperature value being simulated;

the bit sets of the second channel each representing a respective scaled FLIR intensity value in a second range of intensity values that is narrower than said first range, said second range being between a second corresponding minimum temperature value that is below the ambient temperature value and a second corresponding maximum temperature value that is above the ambient temperature value, and

the bit sets of the third channel each representing a respective scaled FLIR intensity value in a third range of intensity values that is narrower than said second range, said third range being between a third corresponding minimum temperature value that is below the ambient temperature value and a third corresponding maximum temperature value that is

above the ambient temperature value;

the combiner circuit, for each pixel of the display device, converting the scaled value from each corresponding bit set in each of the channels to a re-scaled value scaled to a common scale of intensity values that allows comparison of values derived from the channels;

said combiner circuit selecting as a selected scaled value for the pixel the scaled value from the first channel if all three scaled values for the pixel are different, selecting as the selected scaled value for the pixel the scaled value of the second channel if the scaled value of the second channel is equal to the scaled value of the first channel but different from scaled value of the third channel, and selecting as the selected scaled value for the pixel the scaled value of the third channel if all the scaled values for the pixel are different; and

a gain control configured to be adjusted by the user and operatively associated with the display system, the display system receiving from said gain control an electrical indication of a desired gain level to be applied to the display, said display system deriving the output signal for the pixel based on said desired gain level and the selected scaled value.

26. The system of claim 25 wherein the third range has a midpoint at the ambient temperature.

27. The system of claim 25 wherein the display system includes a post processor circuit that receives the selected scaled data from the combiner circuit and the

gain control and adjusts the displayed data based thereon to simulate a gain level specified by the gain control.

28. A method of simulating a sensor system that displays values of a data variable representing a sensed radiation level over a field of view, said method comprising:

for each of a group of locations in the field of view, determining in an image generator a respective data value for the data variable based on a database of scene data in the image generator and on a mathematical model determining radiation from simulated objects based on defined parameters thereof,

storing said data values in two groups of data fields in memory of the image generator, each of said data fields being a field of n bits and corresponding to a respective location in the field of view, each of the groups of data fields having associated therewith scaling parameters that define a respective resolution thereof and a range of radiation values that correspond to scaled values stored therein, said data values being stored in said data fields of the group of data fields in a form of n bits and derived by scaling said data values based on the respective scaling parameters of the group of the data field,

outputting from the image processor a video output signal having at least two channels, each of said channels containing the data values of a respective group of data fields in the respective resolution,

receiving said video output and scaling parameters in a display system,

scaling the scaled data values to a common scale that allows comparison of values from one channel to values from the other channel,

selecting a value from said data values on the common scale based on an

assessment of the data being less likely to have been clamped in value by a range of a channel, and

displaying the selected data value as an intensity on a display device.

29. The method of claim 28 wherein the data variable is infrared radiation intensity, and the determination thereof is based on store parameters for objects viewed that include material of the simulated object and the mathematical model used is a thermal model.

30. The method of claim 28, wherein after storing, the data values are subjected to further modification based on calculations using parameters defining viewing conditions and distance from the object identified to the sensor being simulated.

31. The method of claim 28, wherein the value of n is eight (8).

32. The method of claim 28, wherein the video output has a third channel of data that represents the data values for the locations at a third resolution.

33. The method of claim 28, and further comprising

modifying the value of the selected data value based on an input gain level entered by a user on a simulator gain control device.